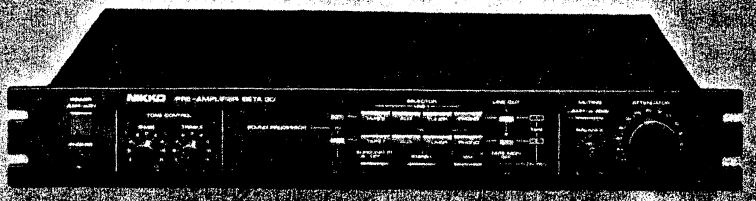
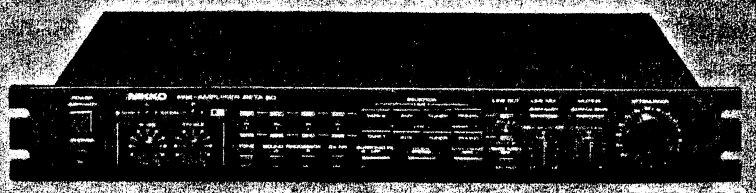
BETA 30/30s
BETA 50/50s

STEREO PREAMPLIFIER



BETA 30



BETA 50

TYPE AND VOLTAGE

W-TYPE :	UL and CSA type	120V AC
E-TYPE :	NK-STD type	220V AC
V-TYPE :	Multi-Voltage type	110/120/220/240V AC

SERVICE MANUAL

CONTENTS

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- ZENER DIODES 19
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SPECIFICATIONS

BETA 30

Preamplifier Section

Total Harmonic Distortion (at 1,000 Hz).
- Phono (MC) to Rec Out (at 7 V output): . . . . . no more than 0.006%
- Phono (MM) to Rec Out (at 7 V output): . . . . . no more than 0.006%
- Aux to Pre Out (at 1.8 V output): . . . . . no more than 0.008%

Input Sensitivity (at 1,000 Hz, 1 V output),
- Phono (MC): . . . . . 0.25 mV ± 2 dB
- Phono (MM): . . . . . 2.5 mV ± 2 dB
- Tuner: . . . . . 150 mV ± 2 dB
- Aux: . . . . . 150 mV ± 2 dB

Input Impedance (at 1,000 Hz),
- Phono (MC): . . . . . 100 ± 10 ohms
- Phono (MM): . . . . . 47 ± 5 kohms
- Tuner: . . . . . 47 ± 10 kohms
- Aux: . . . . . 47 ± 10 kohms
- Tape 1, 2: . . . . . 47 ± 10 kohms

Signal to Noise Ratio with IHF-A Network,
- Phono (MC): . . . . . more than 62 dB
- Phono (MM): . . . . . more than 82 dB
- Tuner: . . . . . more than 90 dB
- Aux: . . . . . more than 90 dB
- Tape 1, 2: . . . . . more than 90 dB

Frequency Response (20 to 20,000 Hz),
- Tuner: . . . . . +0, –1 dB
- Aux: . . . . . +0, –1 dB
- Tape 1, 2: . . . . . +0, –1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),
- Phono (MM) to Rec Out: . . . . . ±1 dB

Tone Control,
- Bass (70 Hz): . . . . . +7, –9 dB
- Treble (10 kHz): . . . . . +7, –9 dB

Muting Delay Time: . . . . . 4 ± 2 seconds

General

Power Requirement,
- U.S.A. & Canada model: . . . . . AC 120V/60 Hz
- European model: . . . . . AC 220V/50 Hz
- U.K. & Australia model: . . . . . AC 240V/50 Hz

Power Consumption: . . . . . 10 watts

Specifications are subject to change without notice.

Dimensions,
- Width: . . . . . 482 mm, 19" (BETA 30)
  440 mm, 17-3/8" (BETA 30s)
- Height: . . . . . 70 mm, 2-3/4"
- Depth: . . . . . 258 mm, 10-1/8"

Weight without package: . . . . . 4.8 kg, 10.6 lbs

BETA 50

Preamplifier Section

Total Harmonic Distortion (at 1,000 Hz).
- Phono (MC) to Rec Out (at 7 V output): ..... no more than 0.006%
- Phono (MM) to Rec Out (at 7 V output): ..... no more than 0.006%
- Aux to Pre Out (at 1.8 V output): ..... no more than 0.08%

Input Sensitivity (at 1,000 Hz, 1 V output),
- Phono (MC): ..... 0.25 mV ± 2 dB
- Phono (MM): ..... 2.5 mV ± 2 dB
- Tuner: ..... 150 mV ± 2 dB
- Aux: ..... 150 mV ± 2 dB

Input Impedance (at 1,000 Hz),
- Phono (MC): ..... 100 ± 10 ohms
- Phono (MM): ..... 47 ± 5 kohms
- Tuner: ..... 47 ± 10 kohms
- Aux: ..... 47 ± 10 kohms
- Tape 1, 2: ..... 47 ± 10 kohms

Signal to Noise Ratio with IHF-A Network,
- Phono (MC): ..... more than 62 dB
- Phono (MM): ..... more than 82 dB
- Tuner: ..... more than 90 dB
- Aux: ..... more than 90 dB
- Tape 1, 2: ..... more than 90 dB

Frequency Response (20 to 20,000 Hz),
- Tuner: ..... +0, −1 dB
- Aux: ..... +0, −1 dB
- Tape 1, 2: ..... +0, −1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),
- Phono (MM) to Rec Out: ..... ±1 dB

Tone Control,
- Bass (70 Hz): ..... +7, −9 dB
- Treble (10 kHz): ..... +7, −9 dB

CX*NR Input Level,
- Calibration VR Max: ..... 120 mV ± 2 dB
- Calibration VR Min: ..... 640 mV ± 2 dB

Muting Delay Time: ..... 4 ± 2 seconds

General

Power Requirement,
- U.S.A. & Canada model: ..... AC 120V/60 Hz
- European model: ..... AC 220V/50 Hz
- U.K. & Australia model: ..... AC 240V/50 Hz

Power Consumption: ..... 13 watts

Dimensions,
- Width: ..... 482 mm, 19" (BETA 50)
  440 mm, 17-3/8" (BETA 50s)
- Height: ..... 70 mm, 2-3/4"
- Depth: ..... 258 mm, 10-1/8"

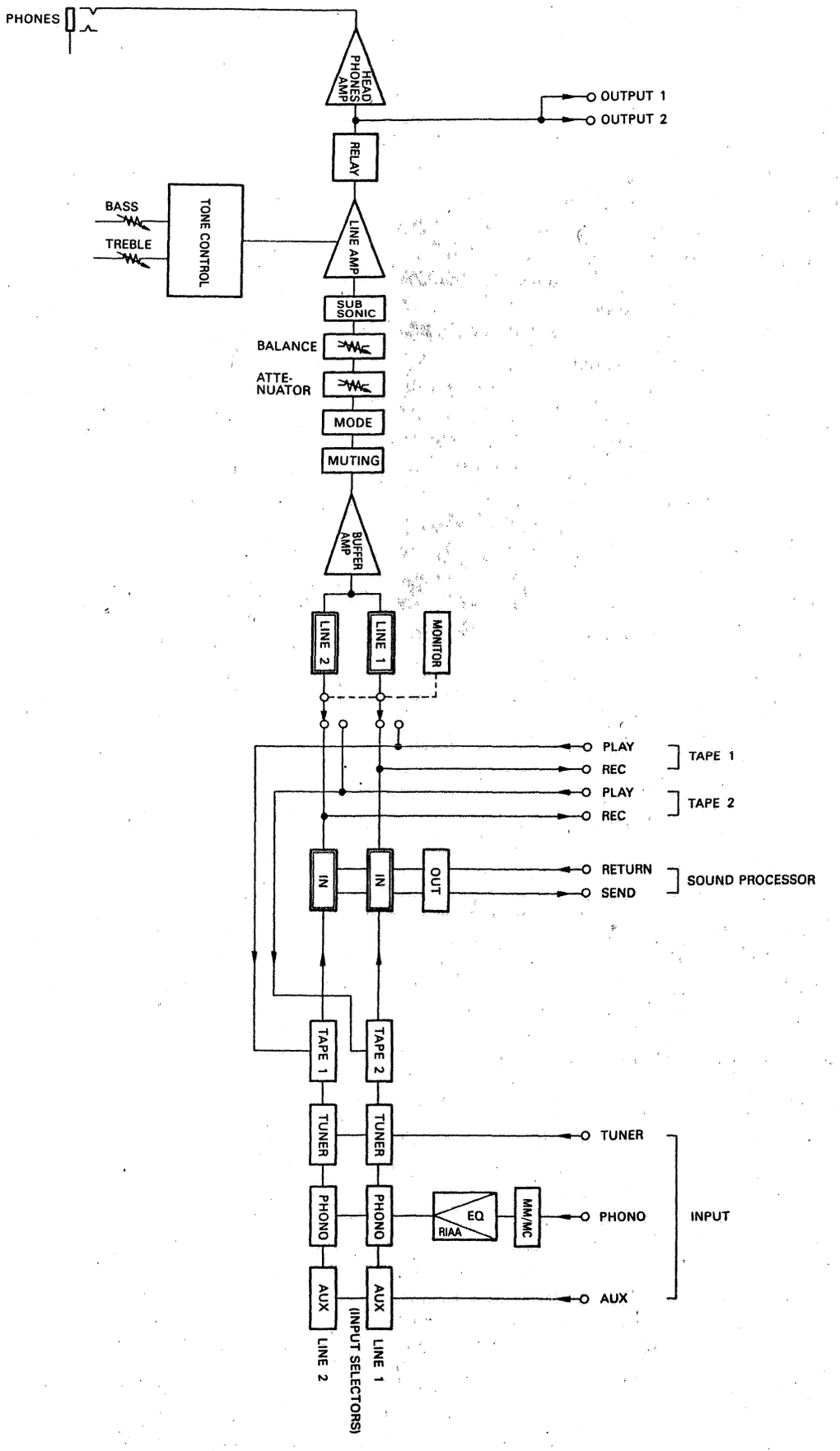
Weight without package: ..... 4.8 kg, 10.6 lbs

Specifications are subject to change without notice.

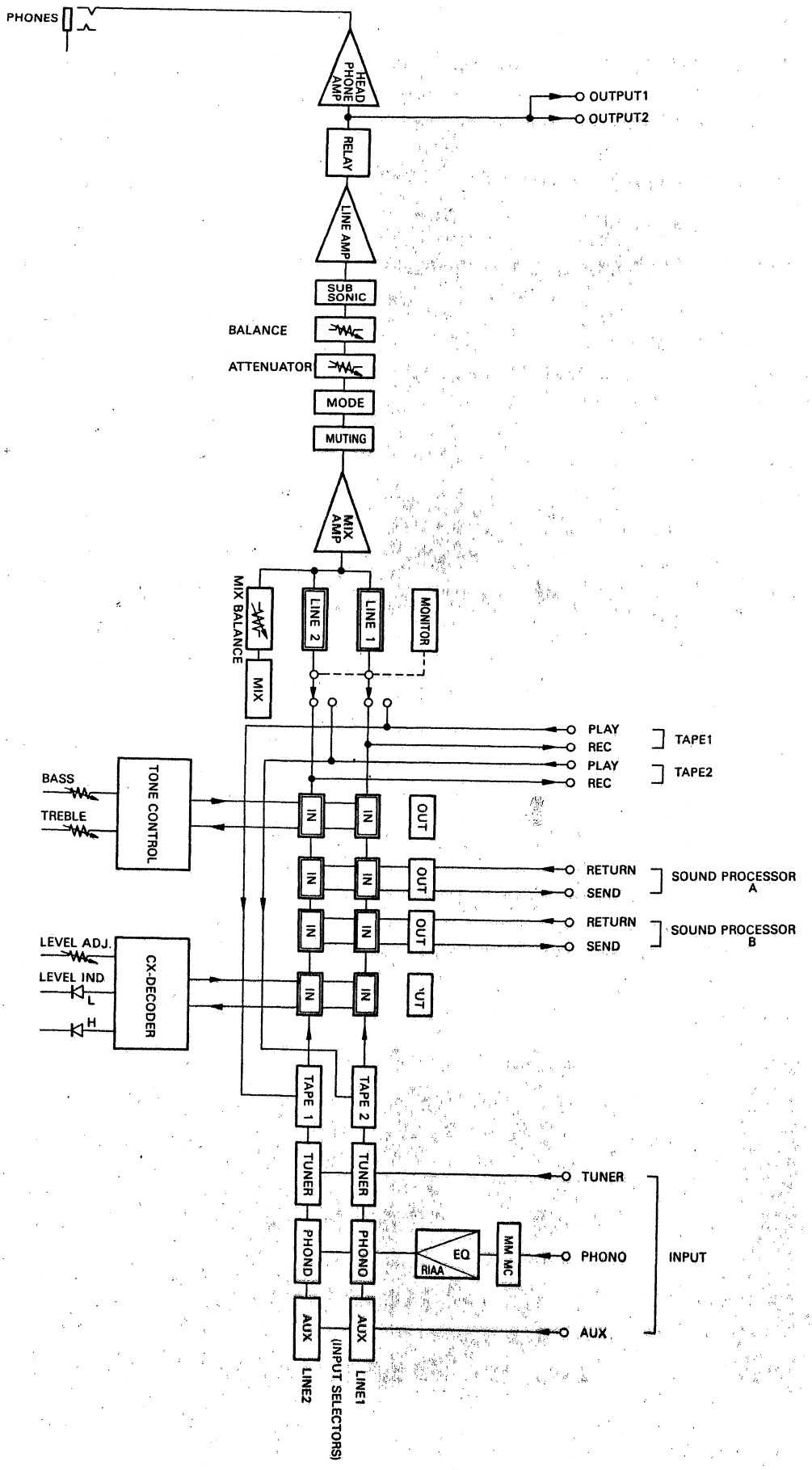
* CX is a trademark of CBS Inc.

BLOCK DIAGRAM

BETA 30



BETA 50


PHONES
HEAD PHONE AMP
OUTPUT1
OUTPUT2
RELAY
LINE AMP
SUB SONIC
BALANCE
ATTENUATOR
MODE
MUTING
MIX AMP
MIX BALANCE
LINE 2
LINE 1
MONITOR
MIX
PLAY
REC
PLAY
REC
TAPE1
TAPE2
BASS
TREBLE
TONE CONTROL
IN
IN
OUT
RETURN
SEND
SOUND PROCESSOR A
RETURN
SEND
SOUND PROCESSOR B
LEVEL ADJ.
LEVEL IND
L
H
CX-DECODER
TAPE 1
TAPE 2
TUNER
TUNER
TUNER
PHONO
PHONO
EQ
RIAA
MM MC
PHONO
AUX
AUX
AUX
INPUT
LINE2
(INPUT SELECTORS)
LINE1

DISASSEMBLY

1. CABINET COVER REMOVAL
   a. Remove four tapping screws from the top of the metal cover.
   b. Remove four screws from both sides of the metal cover.
   c. Lift the cabinet cover away from the unit.
2. BOTTOM PLATE REMOVAL
   a. Remove seven tapping screws (#1~7) as shown in Photo 1.
3. FRONT PANEL REMOVAL
   a. Remove two (or one) knobs (#1, 2 Photo 2) from the front panel by pulling them forward.
   b. Using a hexagonal wrench, remove three knobs (#3 ~ 5)as shown in Photo 2.
   c. Remove two tapping screws from the top of the unit.
   d. Remove the front panel from the unit.
4. POWER TRANSFORMER REMOVAL
   a. Disconnect all wires from the power transformer.
   b. Remove two screws (#1, 2) (Photo 3) from the side plate of the unit.
   c. Lift the power transformer up and out of chassis.

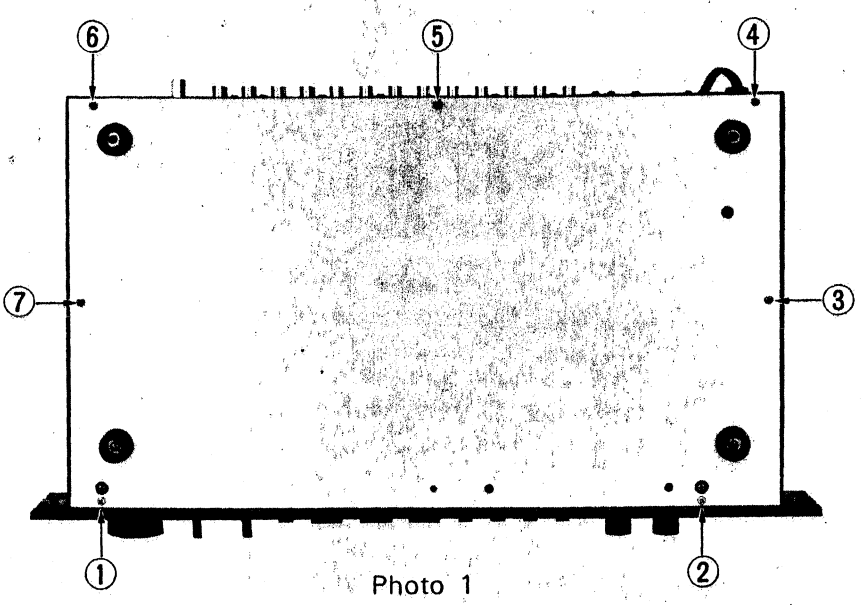


Photo 1

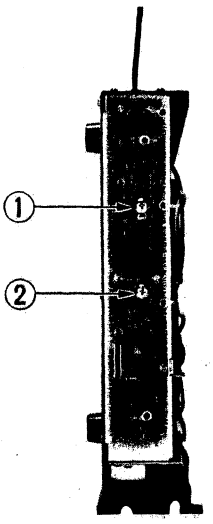


Photo 3

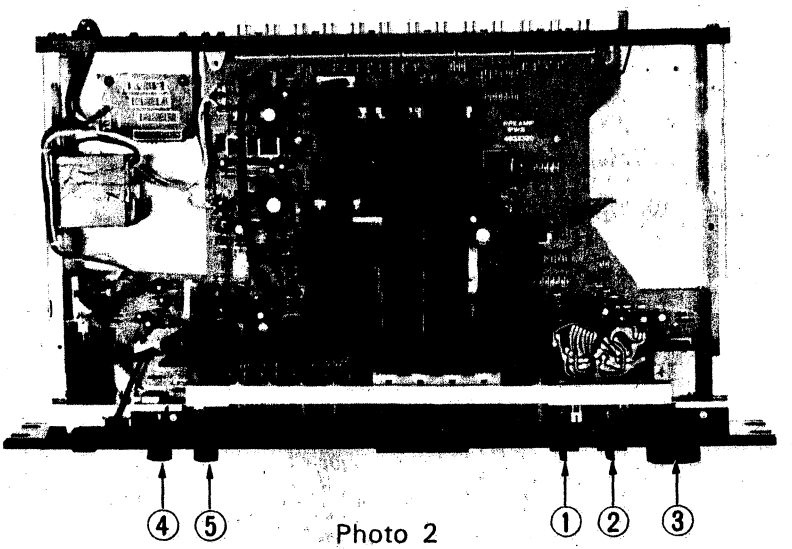


Photo 2

PARTS LOCATION

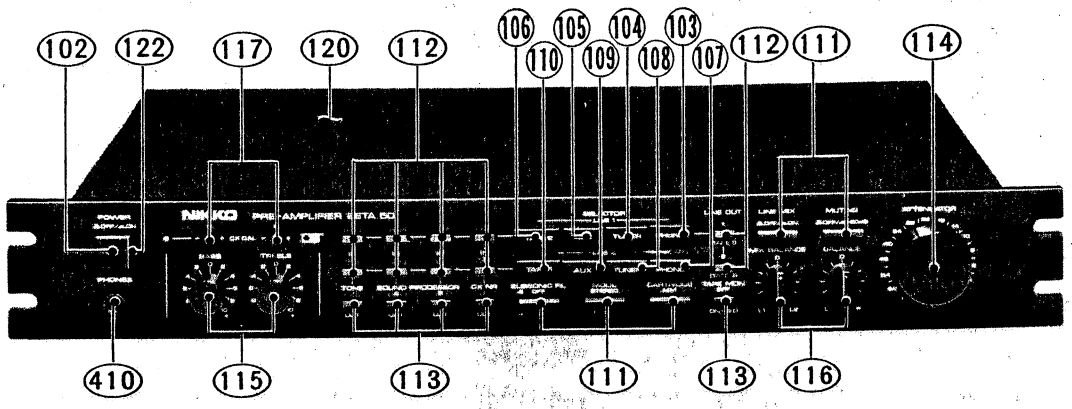


Photo 4

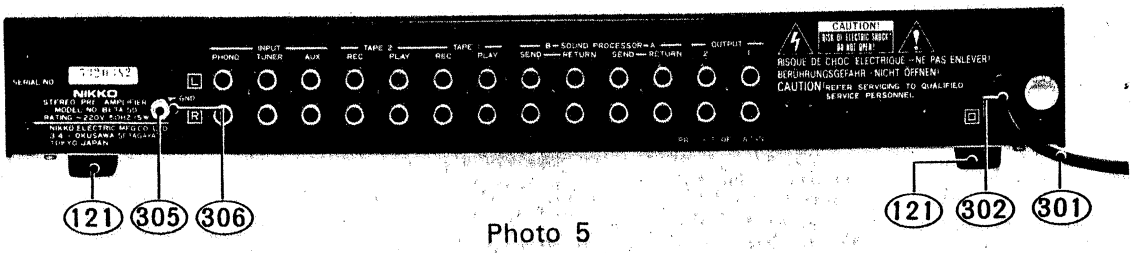


Photo 5

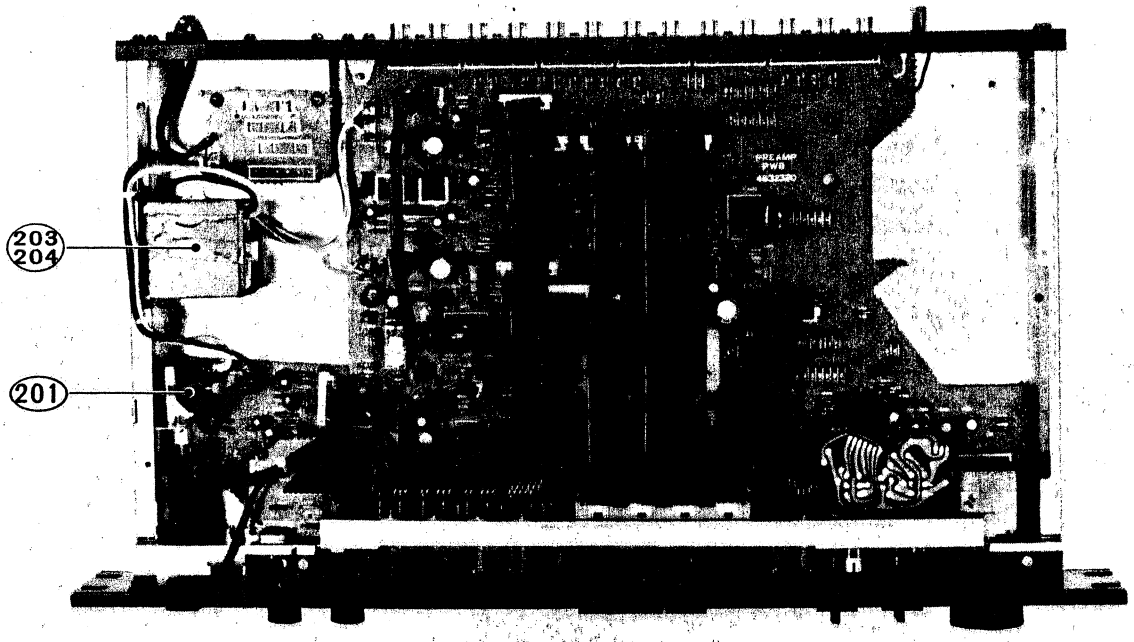


Photo 6

PARTS LIST

NOTES:

1. * The REF. NUMBER (#) marked with a (*) on parts list is related to number of three digits with a (◯). (Photo 4~6).
2. \+ Numberals in file indicate the quantity of parts used in one type.
   - W : U.S.A. & Canada model, AC 120V
   - E : European model, AC 220V
   - V : Multi-voltage model, AC 110/120/220/240V
3. ++
   - TR : Transistor
   - FET : Field effect transistor
   - VR : Volume control (Variable resistor)
   - MO-RES : Metal oxide film fixed resistor
   - CEM-RES : Cemented wirewound fixed resistor
   - FP : Flame proof
   - C-CAP : Ceramic capacitor
   - E-CAP : Aluminum electrolytic capacitor
   - M-CAP : Polyester film capacitor
   - S-CAP : Polystyrene film capacitor
   - T-CAP : Tantalum electrolytic capacitor
   - BP-CAP : Biopolar electrolytic capacitor
   - LC-CAP : Low current leakage electrolytic capacitor
4. Assemblies and parts are subject to change without notice.
5. Parts ordering procedure:
   - A. DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only)
   - B. Include in any order
     - a. Part number. b. Part description. c. Model number.

     (any of the above lacking from an order may delay shipment of that order.)

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS.
FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

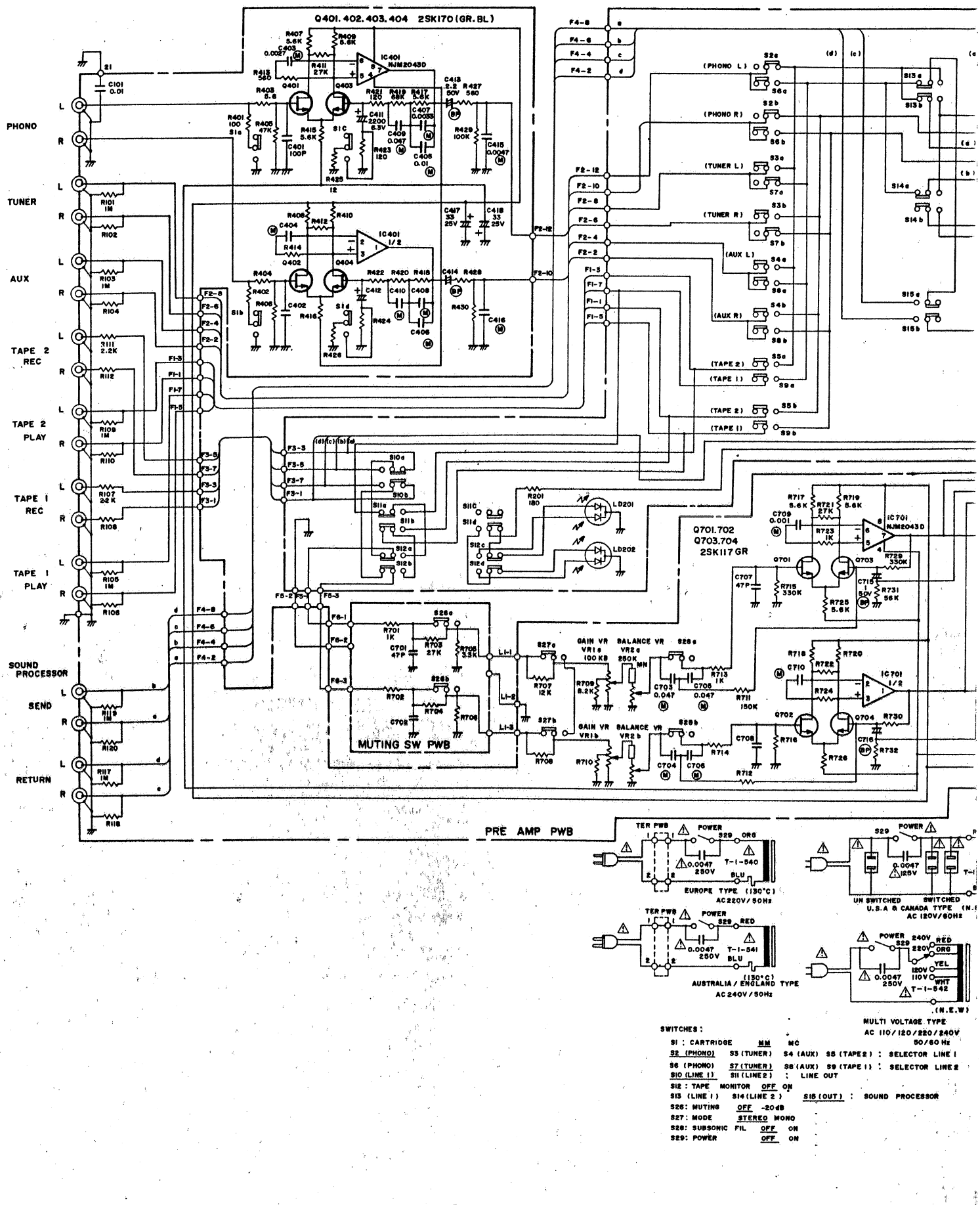
REF. No.	SYMBOL No.	MODEL W E 30 30s	MODEL W E 50 50s	DESCRIPTION	PART No.
		PACKING MATERIALS & ACCESSORIES			
001a		1	– – –	Carton box – BETA 30	9826740
001b		–	1 – –	Carton box – BETA 30s	9826770
001c		–	– 1 –	Carton box – BETA 50	9826750
001d		–	– – 1	Carton box – BETA 50s	9826780
002		2	2 2 2	Pad	9841230
003		1	1 1 1	Sack, polyethylen cloth	9640720
004a		1	– – –	Manual, instructions – in English and French – BETA 30	960429E
004b		1	1 – –	Manual, instructions – in five different languages – BETA 30/s	960429K
004c		–	– 1 –	Manual, instructions – in English and French – BETA 50	960430E
004d		–	– 1 1	Manual, instructions – in five different languages – BETA 50/s	960430K
005		1	1 1 1	Manual, voltage selection – V-type only	960402K
006		1	– 1 –	Card, warranty – U.S.A. only	967046A
007		1	– 1 –	List, service stations – U.S.A. only	9690300
008		1	1 1 1	Cord, RCA phono pin plug	962026A
009		1	1 1 1	Adaptor, AC plug – V-type only	4550230
		CABINET ASSEMBLY			
★101a		1	– – –	Front panel assembly – BETA 30	7886390
★101b		–	1 – –	Front panel assembly – BETA 30s	7886380
★101c		–	– 1 –	Front panel assembly – BETA 50	7886410
★101d		–	– – 1	Front panel assembly – BETA 50s	7886400
★102a		1	– 1 –	Button, push – M15SQ-BK – power, BLACK	7852390
★102b		–	1 – 1	Button, push – M15SQ-SL – power, SILVER	7853930
★103		1	1 1 1	Button, push – P819BK-PHON-1 – phono 1	7853820
★104		1	1 1 1	Button, push – P819BK-TUN-1 – tuner 1	7853830
★105		1	1 1 1	Button, push – P819BK-AUX-1 – aux 1	7853840
★106		1	1 1 1	Button, push – P819BK-TPE-2 – tape 2	7853860
★107		1	1 1 1	Button, push – P819BK-PHON-2 – phono 2	7853870
★108		1	1 1 1	Button, push – P819BK-TUN-2 – tuner 2	7853880
★109		1	1 1 1	Button, push – P819BK-AUX-2 – aux 2	7853890
★110		1	1 1 1	Button, push – P819BK-TPE-1 – tape 1	7853850
★111a		4	– 5 –	Button, push – P319W-BK – subsonic/mode/cartridge/muting/(line mix) – BLACK	7853690
★111b		–	4 – 5	Button, push – P319W-SL – subsonic/mode/cartridge/muting/(line mix) – SILVER	7853700

REF. No.	SYMBOL No.	MODEL W E 30 30s	MODEL W E 50 50s	DESCRIPTION	PART No.
★112		4	4 10 10	Button, push – P309B-C – others, CLEAR	7853800
★113		2	2 5 5	Button, push – P309B-BK – others, BLACK	7853810
★114a		1	– 1 –	Knob – 2BK-34D – attenuator, BLACK	7851740
★114b		–	1 – 1	Knob – 2SL-34D – attenuator, SILVER	7841880
★115a		1	– 1 –	Knob – 30BK-16R – bass/treble, BLACK	7841870
★115b		–	1 – 1	Knob – 30SL-16R – bass/treble, SILVER	7841860
★116		1	1 2 2	Knob – P2BK-1613DL – balance/(mix balance)	7852350
★117a		–	– 2 –	Knob – 30BK-5.5R – CX cal., BLACK	7841920
★117b		–	– – 2	Knob – 30SL-5.5R – CX cal., SILVER	7841910
118		1	1 2 2	Shaft, extension – 16.5M	7405030
119		3	3 3 3	Shaft, extension – 63M	7403460
★120		1	1 1 1	Cover, top	7821510
★121		4	4 4 4	Foot, plastic	7403520
★122		1	1 1 1	Guide, button P15S9BK power switch	7402680

REF. NO.	SYMBOL NO.	TYPE B30 W E V	TYPE B50 W E V	DESCRIPTION	PART NO.
		CHASSIS ASSEMBLY			
⚠ ★201a		1	– –	Switch, push-power – U.S.A. & Canada type	4042620
⚠ ★201b		–	1 – –	Switch, push-power – Europe type	4041820
⚠ ★202		1	1 1 1	C-CAP, 0.0047 uf	239472A
⚠ ★203a		1	– –	Transformer, Power T-1.539 – AC 120V	1106390
⚠ ★203b		–	1 –	Transformer, Power T-1.540 – AC 220V	1106400
⚠ ★203c		–	– 1	Transformer, Power T-1.542 – AC 110/120/220/240V	1106420
⚠ ★204a		1	– –	Transformer, Power T-1.543 – AC 120V	1106430
⚠ ★204b		–	1 –	Transformer, Power T-1.544 – AC 220V	1106440
⚠ ★204c		–	– 1	Transformer, Power T-1.545 –	1106450
		BACK PLATE ASSEMBLY			
⚠ ★301a		1	– –	Cord, power – CP-30 – U.S.A. type	8005070
⚠ ★301b		–	1 –	Cord, power – CEE-21 – Europe type	8005080
⚠ ★301c		–	– 1	Cord, power – BS-89 – U.K. type	8005100
⚠ ★302a		1	– –	Jack, power cord – CP-30 – U.S.A. type & multi-voltage type	7800670
⚠ ★302b		–	1 –	Jack, power cord – CEE-21 – Canada & Europe type	7400680
⚠ ★303a		2	– –	Speaker, AC outlet – U.S.A. type	4500190
⚠ ★303b		–	2 –	Speaker, AC outlet – Canada type	4500260
⚠ ★304		1	1 1	Fuseholder assembly – AC indoor fuse type	4830640
★305		1	1 1 1 1 1	Shaft, GND terminal	7152050
★306		1	1 1 1 1 1	Nut, GND terminal	7152060

more → P.16

SCHEMATIC DIAGRAM BETA 30



SWITCHES :

S1 : CARTRIDGE MM MC

S2 (PHONO) S3 (TUNER) S4 (AUX) S5 (TAPE2) : SELECTOR LINE 1

S6 (PHONO) S7 (TUNER) S8 (AUX) S9 (TAPE1) : SELECTOR LINE 2

S10 (LINE 1) S11 (LINE 2) : LINE OUT

S12 : TAPE MONITOR OFF ON

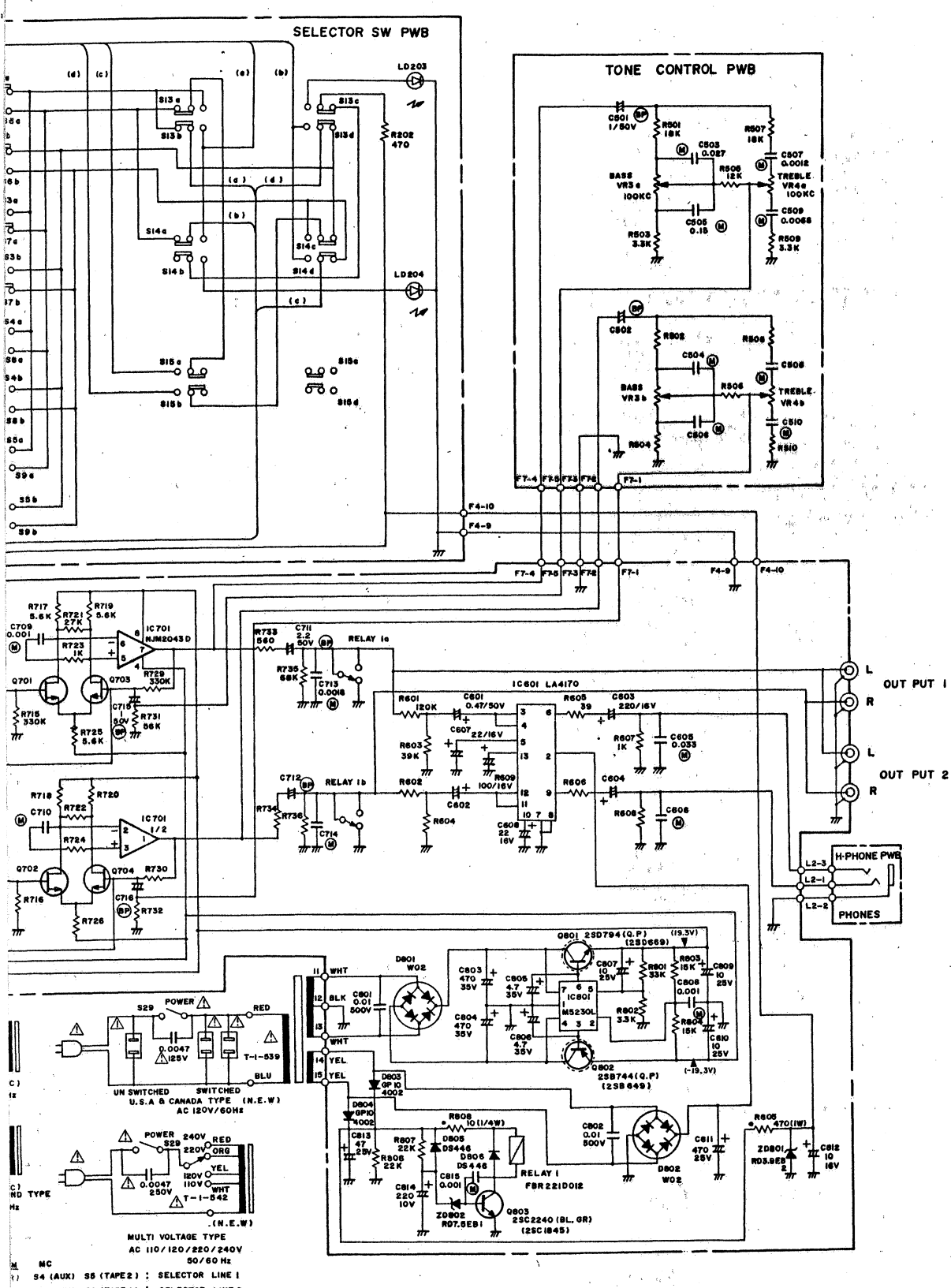
S13 (LINE 1) S14 (LINE 2) S15 (OUT) : SOUND PROCESSOR

S26: MUTING OFF -20dB

S27: MODE STEREO MONO

S28: SUBSONIC FIL OFF ON

S29: POWER OFF ON



M MC

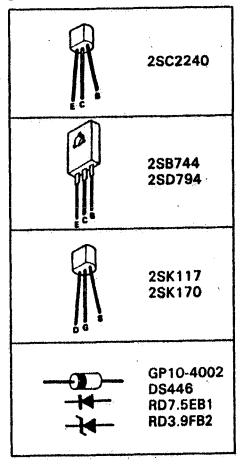
S4 (AUX) S5 (TAPE 2) : SELECTOR LINE 1

S6 (AUX) S9 (TAPE 1) : SELECTOR LINE 2

: LINE OUT

S18 (OUT) : SOUND PROCESSOR

SEMICONDUCTORS



NOTES:

1. SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED:

2. RESISTANCE VALUES ARE IN OHMS. K=1,000 ; M=1,000,000
3. CAPACITANCE VALUES 1.0 AND ABOVE ARE IN pF OR μF (P=pF, M=μF), LESS THAN 1.0 ARE IN μF. (ELECTROLYTIC CAPACITANCE VALUES ARE IN μF/WV.)
4. VOLTAGES ARE MEASURED TO CHASSIS GROUND WITH A "DC VOLTMETER".

SCHEMATIC SYMBOLS:

Ⓜ POLYESTER FILM CAPACITOR
(NO MARK) CERAMIC CAPACITOR
• NONFLAMMABLE RESISTOR

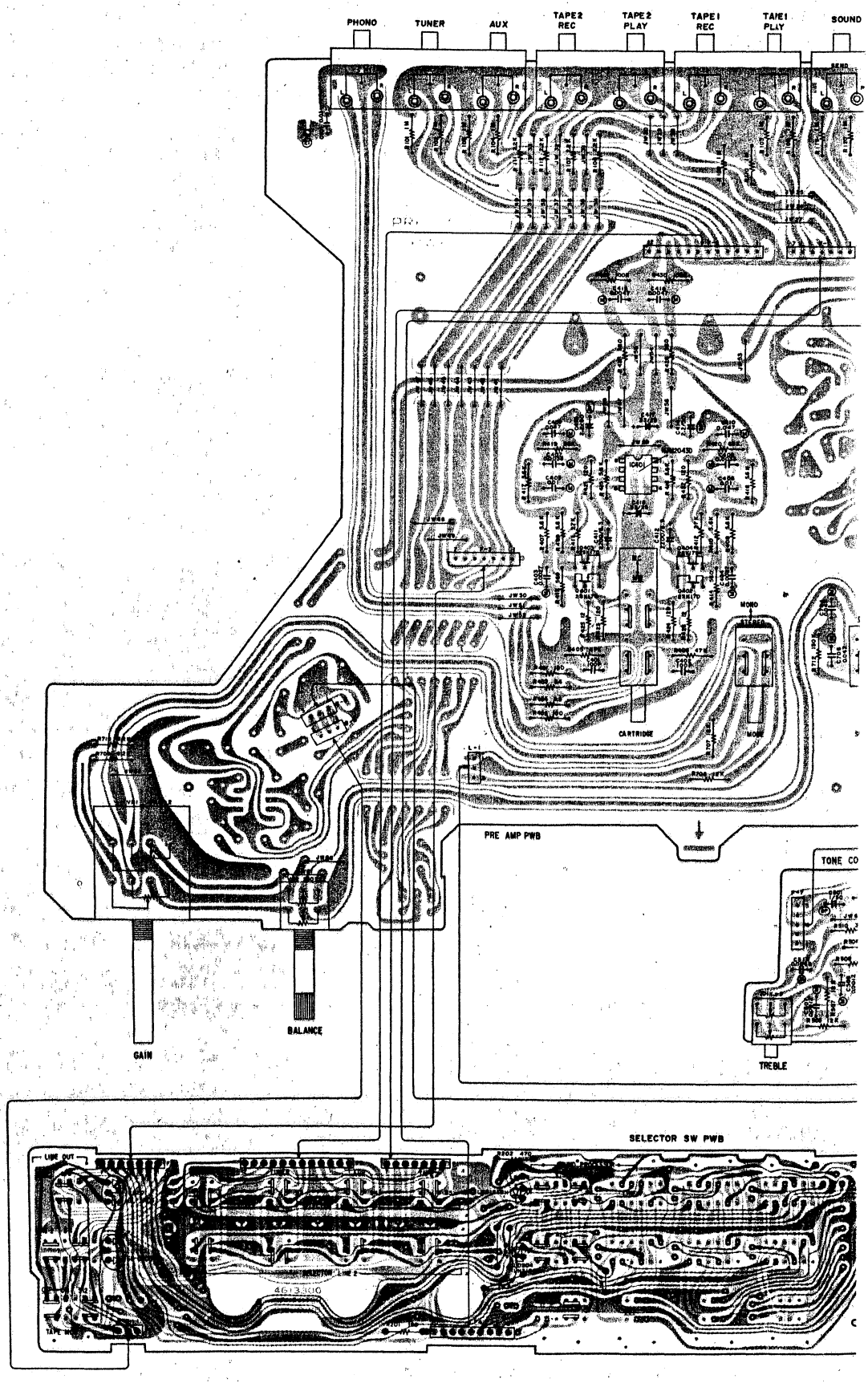
SERVICE INFORMATION:

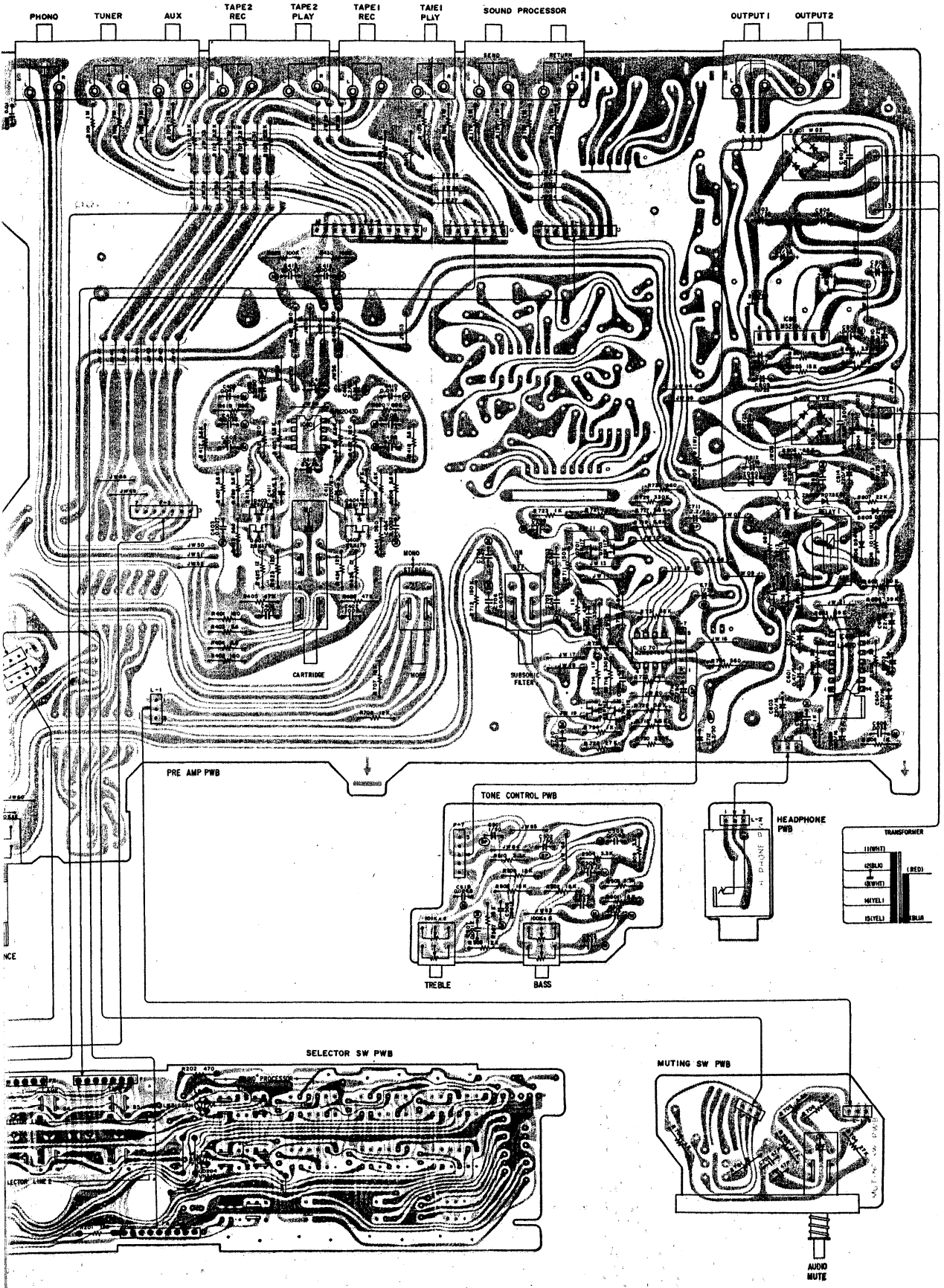
CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.
2. ⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER, YOU MAKE LEAKAGE-CURRENT OR RESISTANCE MEASURMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

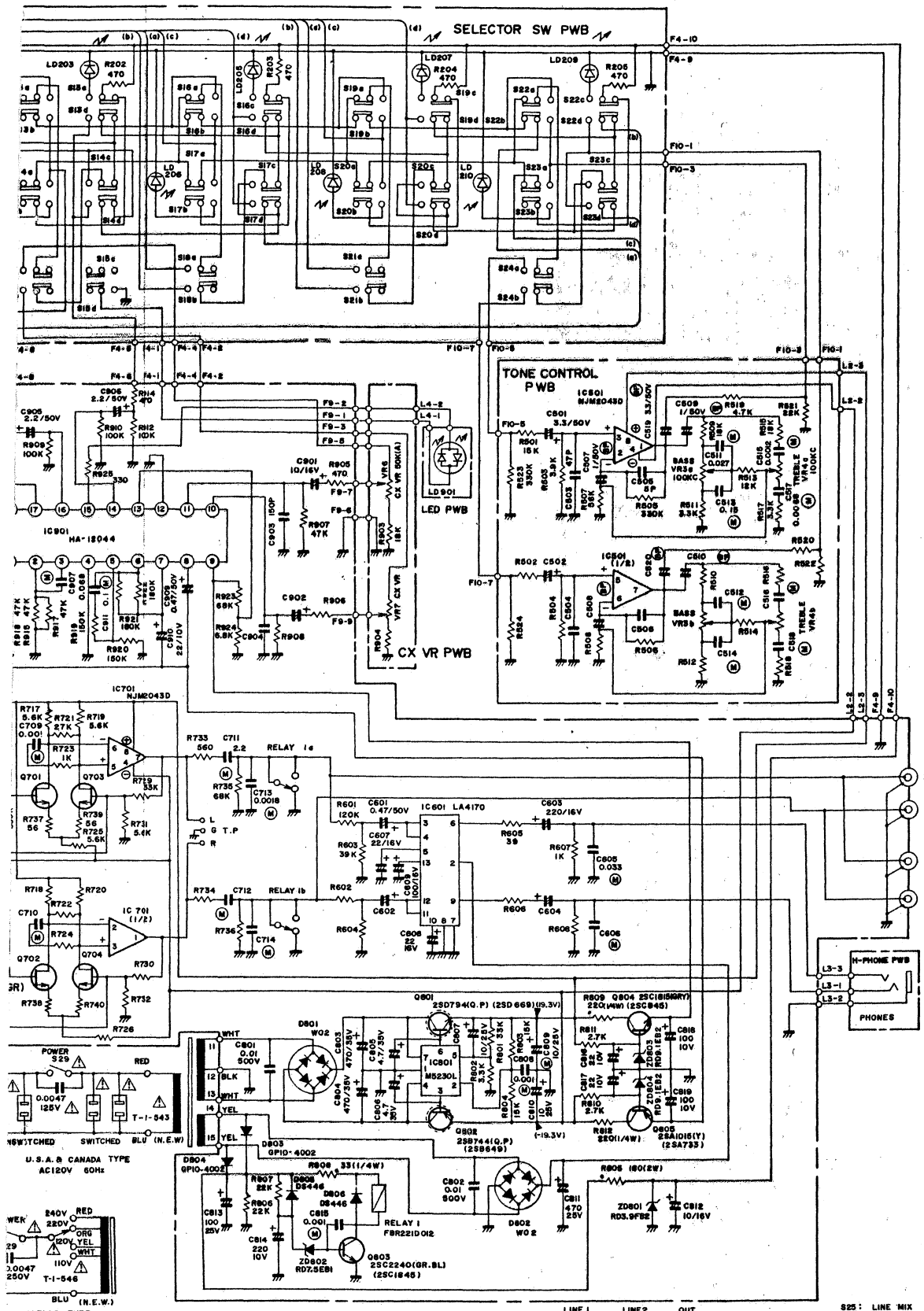
P. C. BOARD (CONDUCTIVE SIDE VIEW)

BETA 30

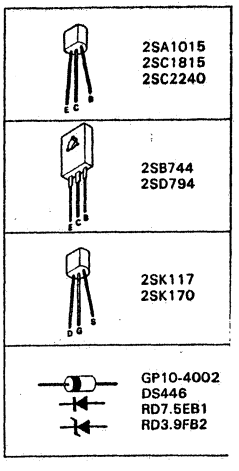




Q, IC	D
	8
802	
801	
IC801	
IC401	802
	804,8
803	ZD801
	ZD80
403, 404	8
401, 402	
701,703	8
IC601	
IC701	
702,704	
	LD201, LD203
	LD202, LD204
Q, IC	D


SELECTOR SW PWB
TONE CONTROL PWB
LED PWB
CX VR PWB
H-PHONE PWB
PHONES
OUT PUT 1
OUT PUT 2
POWER S29
U.S.A. & CANADA TYPE
AC120V 60Hz
SWITCHES:
S1 : CARTRIDGE MM MC
S2 (PHONO) S3(TUNER) S4(AUX) S5(TAPE2) : SELECTOR LINE1
S6 (PHONO) S7(TUNER) S8(AUX) S9(TAPE1) :SELECTOR LINE2
S10 (LINE1) S11(LINE2) : LINE OUT
S12 : TAPE MONITOR OFF ON
LINE1 LINE2 OUT
S13 S14 S15 : CX NR
S16 S17 S18 : SOUND PROCESSOR B
S19 S20 S21 : SOUND PROCESSOR A
S22 S23 S24 : TONE CONTROL
S25 : LINE MIX OFF ON
S26 : MUTING OFF -20dB
S27 : MODE STEREO MONO
S28 : SUBSONIC FIL OFF ON
S29 : POWER OFF ON

SEMICONDUCTORS



NOTES:

1. SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED:

2. RESISTANCE VALUES ARE IN OHMS K=1,000 ; M=1,000,000
3. CAPACITANCE VALUES 1.0 AND ABOVE ARE IN pF OR μF (P=pF, M=μF), LESS THAN 1.0 ARE IN μF. (ELECTROLYTIC CAPACITANCE VALUES ARE IN μF/WV
4. VOLTAGES ARE MEASURED TO CHASSIS GROUND WITH A "DC VOLTMETER"

SCHEMATIC SYMBOLS:

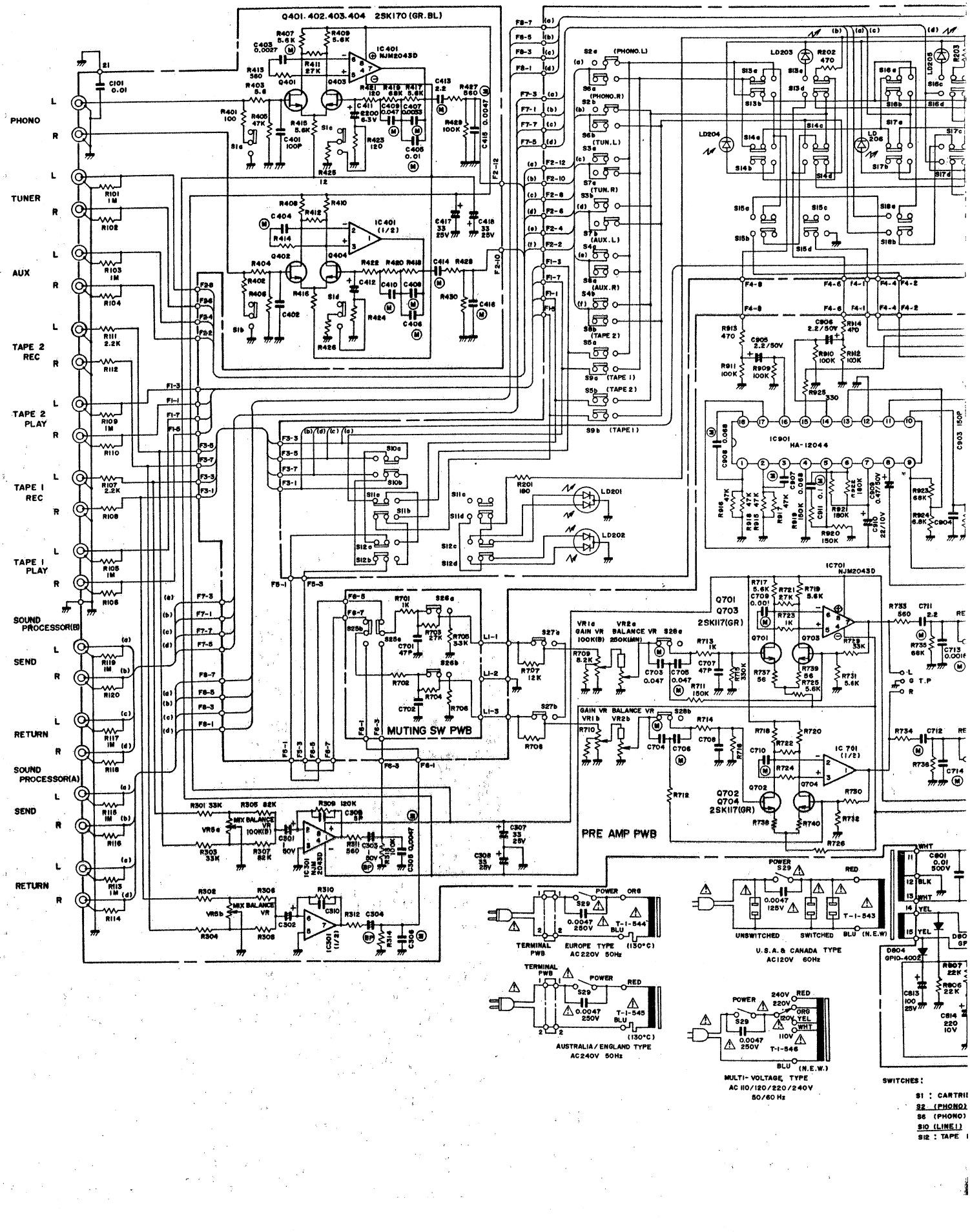
Ⓜ POLYESTER FILM CAPACITOR
(NO MARK) CERAMIC CAPACITOR
• NONFLAMMABLE RESISTOR

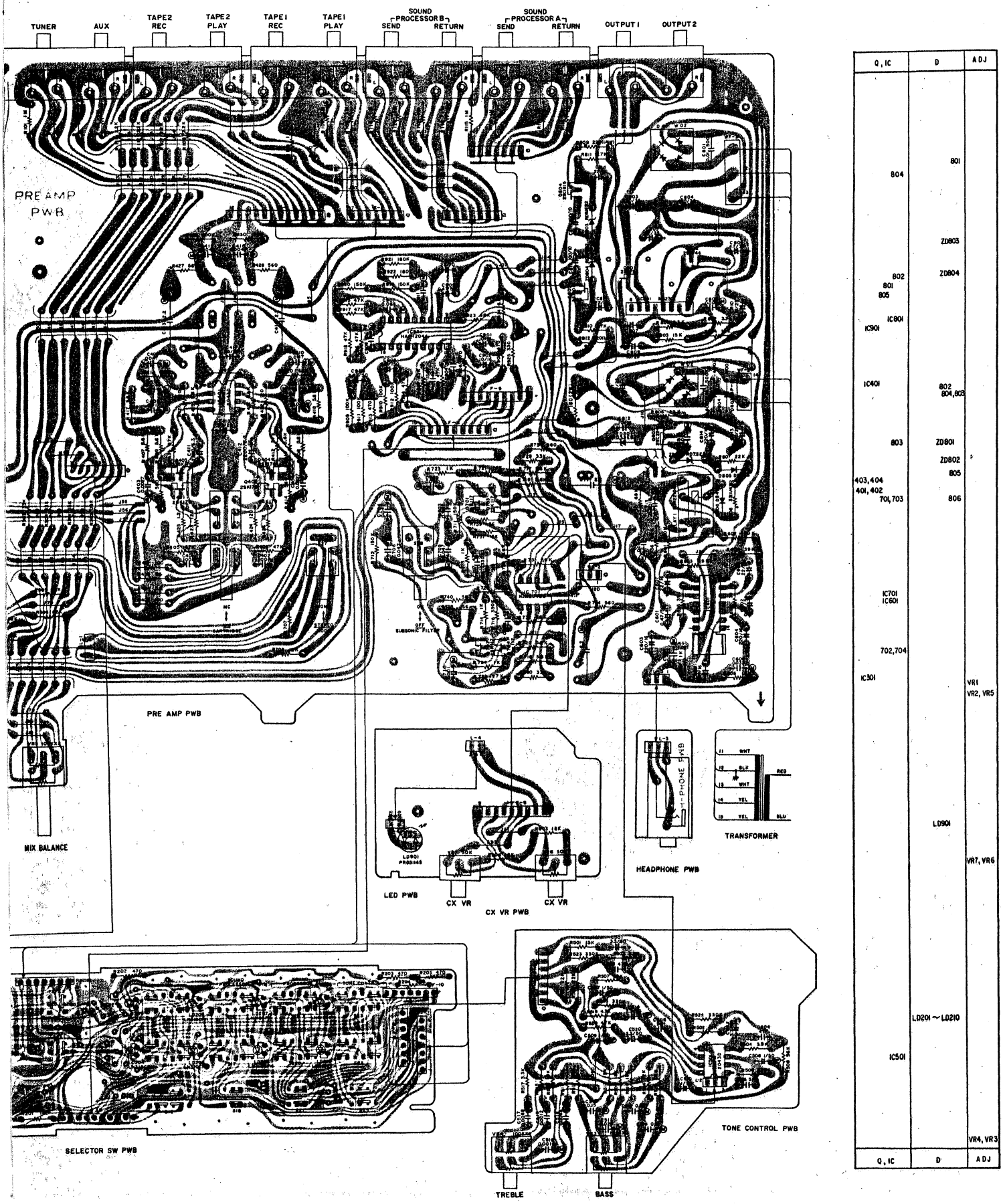
SERVICE INFORMATION:

CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.
2. ⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER, YOU MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

SCHEMATIC DIAGRAM BETA 50

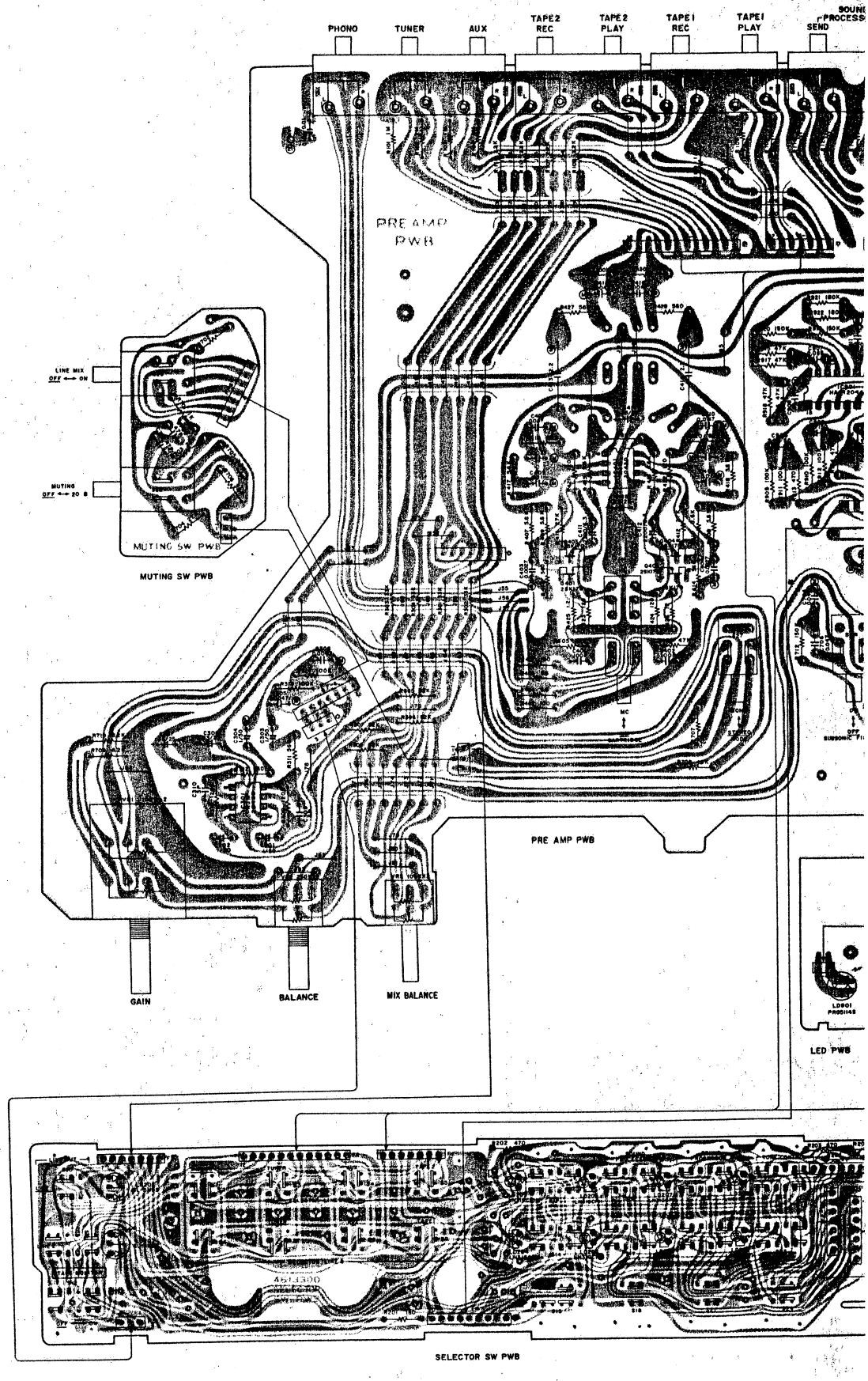




Q, IC	D	ADJ
	801	
804		
	ZD803	
802	ZD804	
801		
805		
IC801		
IC901		
IC401	802	
	804, 803	
803	ZD801	
	ZD802	
	805	
403, 404		
401, 402		
701, 703	806	
IC701		
IC601		
702, 704		
IC301		VR1
		VR2, VR5
	LD901	
		VR7, VR6
	LD201 ~ LD210	
IC501		
		VR4, VR3
Q, IC	D	ADJ

P. C. BOARD (CONDUCTIVE SIDE VIEW)

BETA 50



PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only) Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF. No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
			BETA 30/s PREAMPLIFIER PWB ASSEMBLY	
			(TONE CONTROL SECTION)	
401	VR3, 4	2 2 2	VR 100kohm (C) x 2 – bass/treble	4321430
	C501,502	2 2 2	BP-CAP 1uf 50V	215510N
	C503,504	2 2 2	M-CAP 0.027uf 5% 50V	222273J
	C505,506	2 2 2	M-CAP 0.15uf 5% 50V	222154J
	C507,508	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C509,510	2 2 2	M-CAP 0.0068uf 5% 50V	222682J
	R501,502	2 2 2	RES 18kohm 5% ¼W	328183J
	R503,504	2 2 2	RES 3.3kohm 5% ¼W	328332J
	R505,506	2 2 2	RES 12kohm 5% ¼W	328123J
	R507,508	2 2 2	RES 18kohm 5% ¼W	328183J
	R509,510	2 2 2	RES 3.3kohm 5% ¼W	328332J
			(TONE AMP SECTION)	
	IC701	1 1 1	IC NJM2043D	518220S
	Q701~704	4 4 4	FET 2SK117 (GR)	516048S
	C707,708	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C709,710	2 2 2	M-CAP 0.001uf 5% 50V	222102J
	C711,712	2 2 2	BP-CAP 2.2uf 50V	215512N
	C713,714	2 2 2	M-CAP 0.0018uf 5% 50V	222182J
	C715,716	2 2 2	BP-CAP 1uf 50V	215510N
	R713,714	2 2 2	RES 1kohm 5% ¼W	328102J
	R715,716	2 2 2	RES 330kohm 5% ¼W	328334J
	R717~720	4 4 4	RES 5.6kohm 5% ¼W	328562J
	R712,722	2 2 2	RES 27kohm 5% ¼W	328273J
	R723,724	2 2 2	RES 1kohm 5% ¼W	328102J
	R725,726	2 2 2	RES 5.6kohm 5% ¼W	328562J
	R729,730	2 2 2	RES 330kohm 5% ¼W	328334J
	R731,732	2 2 2	RES 56kohm 5% ¼W	328563J
	R733,734	2 2 2	RES 560ohm 5% ¼W	328561J
			(PUSH SWITCH SECTION)	
402	S1	1 1 1	Switch, mono push – cartridge selector	4042600
403	S26	1 1 1	Switch, mono push – muting	4042580
405	S27,28	2 2 2	Switch, mono push – mode/subsonic	4042590
			(TERMINAL SECTION)	
406		1 1 1	Terminal, RCA phono pin jack – 2P x 3	4446050
407		4 4 4	Terminal, RCA phono pin jack – 2P x 2	4444120
	R101~106	6 6 6	RES 1meg.ohm 5% ¼W	328105J
	R107,108	2 2 2	RES 2.2kohm 5% ¼W	328222J
	R109,110	2 2 2	RES 1meg.ohm 5% ¼W	328105J
	R111,112	2 2 2	RES 2.2kohm 5% ¼W	328222J
			(EQ AMP SECTION)	
	IC401	1 1 1	IC NJM2043D	518220S
	Q401~404	4 4 4	FET 2SK170 (GR or BL)	516039S
	C101	1 1 1	C-CAP 0.01uf +80, –20% 50V YG	231103Z
	C401,402	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C403,404	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C405,406	2 2 2	M-CAP 0.01uf 5% 50V	222103J
	C407,408	2 2 2	M-CAP 0.0033uf 5% 50V	222332J
	C409,410	2 2 2	M-CAP 0.047uf 5% 50V	222473J
	C411,412	2 2 2	E-CAP 2200uf 6.3V	211042S
	C413,414	2 2 2	BP-CAP 2.2uf 50V	215512N
	C415,416	2 2 2	M-CAP 0.0047uf 5% 50V	222472J
	C417,418	2 2 2	E-CAP 33uf 25V	211323S
	R401,402	2 2 2	RES 100ohm 5% ¼W	328101J
	R403,404	2 2 2	RES 5.6ohm 5% ¼W	328568J

REF. No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
	R405,406	2 2 2	RES 47kohm 5% ¼W	328473J
	R407~410	10 10 10	RES 5.6kohm 5% ¼W	328562J
	R411,412	2 2 2	RES 27kohm 5% ¼W	328273J
	R413,414	2 2 2	RES 150ohm 5% ¼W	328151J
	R415~418	4 4 4	RES 5.6kohm 5% ¼W	328562J
	R419,420	2 2 2	RES 68kohm 5% ¼W	328683J
	R421~424	4 4 4	RES 120ohm 5% ¼W	328121J
	R425,426	2 2 2	RES 12ohm 5% ¼W	328120J
	R427,428	2 2 2	RES 560ohm 5% ¼W	328561J
	R429,430	2 2 2	RES 100kohm 5% ¼W	328104J
			(MUTING SECTION)	
	C701,702	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	R701,702	2 2 2	RES 1kohm 5% ¼W	328102J
	R703,704	2 2 2	RES 27kohm 5% ¼W	328273J
	R705,706	2 2 2	RES 3.3kohm 5% ¼W	328332J
			(VOLUME CONTROL SECTION)	
408	VR1	1 1 1	VR 100kohm (B) x 2	4390180
409	VR2	1 1 1	VR 250kohm (MN)	4321440
	C703~706	4 4 4	M-CAP 0.047uf 5% 50V	222473J
	R707,708	2 2 2	RES 12kohm 5% ¼W	328123J
	R709,710	2 2 2	RES 8.2kohm 5% ¼W	328822J
	R711,712	2 2 2	RES 150kohm 5% ¼W	328154J
			(HEADPHONE AMP SECTION)	
★410		1 1 1	Jack, headphones	4550360
	IC601	1 1 1	IC LA4170	518089S
	C601,602	2 2 2	E-CAP 0.47uf 50V	211505S
	C603,604	2 2 2	E-CAP 220uf 16V	211232S
	C605,606	2 2 2	M-CAP 0.033uf 5% 50V	222333J
	C607,608	2 2 2	E-CAP 22uf 16V	211222S
	C609	1 1 1	E-CAP 100uf 16V	211230S
	R601,602	2 2 2	RES 120kohm 5% ¼W	328124J
	R603,604	2 2 2	RES 39kohm 5% ¼W	328393J
	R605,606	2 2 2	RES 39ohm 5% ¼W	328390J
	R607,608	2 2 2	RES 1kohm 5% ¼W	328102J
			(RELAY DRIVE SECTION)	
411	RELAY1	1 1 1	Relay – FBR221D012	1700490
	Q803	1 1 1	TR 2SC2240 (GR or BL)	512102S
	D803,804	2 2 2	Diode GP10-4002	560066S
	D805,806	2 2 2	Diode DS446	501028S
	ZD802	1 1 1	Zener diode RD7.5EB1	502062S
	C813	1 1 1	E-CAP 47uf 25V	211325S
	C814	1 1 1	E-CAP 220uf 10V	211132S
	C815	1 1 1	M-CAP 0.001uf 5% 50V	222102J
	R806,807	2 2 2	RES 22kohm 5% ¼W	328223J
	R808	1 1 1	FP-RES 10ohm 5% ¼W	328100L
			(REGULATOR SECTION)	
	IC801	1 1 1	IC M5230L	518221S
	Q801	1 1 1	TR 2SD794 (Q or P)	513131S
	Q802	1 1 1	TR 2SB744 (Q or P)	511127S
	D801,802	2 2 2	Diode W02	560061S
	ZD801	1 1 1	Zener diode RD3.9EB22	502061S

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REF No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
	C801,802	2 2 2	C-CAP 0.01uf 500V	238103P
	C803,804	2 2 2	E-CAP 470uf 35V	211435S
	C805,806	2 2 2	E-CAP 4.7uf 35V	211415S
	C807	1 1 1	E-CAP 10uf 25V	211320S
	C808	1 1 1	M-CAP 0.001uf 5% 50V	222102J
	C809,810	2 2 2	E-CAP 10uf 25V	211320S
	C811	1 1 1	E-CAP 470uf 25V	211335S
	C812	1 1 1	E-CAP 10uf 16V	211220S
	R801	1 1 1	RES 33kohm 5% ¼W	328333J
	R802	1 1 1	RES 3.3kohm 5% ¼W	328332J
	R803,804	2 2 2	RES 15kohm 5% ¼W	328153J
	R805	1 1 1	FP-MO-RES 470ohm 5% 1W	361471L
	BETA 30/s: SELECTOR PWB ASSEMBLY			
501	S2~S9	2 2 2	Switch, tetra push – input selector	4042540
502	S10~S12	1 1 1	Switch, tri push – line out selector	4042560
503	S13~S15	1 1 1	Switch, tri push – sound processor	4042550
505	LD201,202	2 2 2	LED GL-5ND5 – red and green	5060790
506	LD203,204	2 2 2	LD LN31GCPH – green	5060730
	R201	1 1 1	RES 180ohm 5% ¼W	328181J
	R202	1 1 1	RES 470ohm 5% ¼W	328471J
	BETA 50/s: PREAMPLIFIER PWB ASSEMBLY			
	(TONE CONTROL SECTION)			
401	VR3, 4	2 2 2	VR 100kohm (C) x 2 – bass/treble	4321430
	IC501	1 1 1	IC NJM2043D	518220S
	C501,502	2 2 2	E-CAP 3.3uf 50V	211513S
	C503,504	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C505,506	2 2 2	C-CAP 5pf ± 0.5pf 50V SL	232509D
	C507~510	4 4 4	BP-CAP 1uf 50V	215510N
	C511,512	2 2 2	M-CAP 0.027uf 5% 50V	222273J
	C513,514	2 2 2	M-CAP 0.15uf 5% 50V	222154J
	C515,516	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C517,518	2 2 2	M-CAP 0.0068uf 5% 50V	222682J
	C519,520	2 2 2	BP-CAP 3.3uf 50V	215513N
	R501,502	2 2 2	RES 15kohm 5% ¼W	328153J
	R503,504	2 2 2	RES 3.9kohm 5% ¼W	328392J
	R505,506	2 2 2	RES 330kohm 5% ¼W	328334J
	R507,508	2 2 2	RES 56kohm 5% ¼W	328563J
	R509,510	2 2 2	RES 18kohm 5% ¼W	328183J
	R511,512	2 2 2	RES 3.3kohm 5% ¼W	328332J
	R513,514	2 2 2	RES 12kohm 5% ¼W	328123J
	R515,516	2 2 2	RES 18kohm 5% ¼W	328183J
	R517,518	2 2 2	RES 3.3kohm 5% ¼W	328332J
	R519,520	2 2 2	RES 4.7kohm 5% ¼W	328472J
	R521,522	2 2 2	RES 22kohm 5% ¼W	328223J
	R523,524	2 2 2	RES 330kohm 5% ¼W	328334J
	(PUSH SWITCH SECTION)			
402	S1	1 1 1	Switch, mono push – cartridge selector	4042600
404	S25,26	1 1 1	Switch, twin push – line mix/muting	4042530
405	S27,28	2 2 2	Switch, mono push – mode/subsonic	4042590
	(TERMINAL SECTION)			
406		1 1 1	Terminal, RCA phono pin jack – 2P x 3	4446050
407		5 5 5	Terminal, RCA phono pin jack – 2P x 2	4444120
	R101~106	6 6 6	RES 1meg.ohm 5% ¼W	328105J
	R107,108	2 2 2	RES 2.2kohm 5% ¼W	328222J
	R109,110	2 2 2	RES 1meg.ohm 5% ¼W	328105J

REF. No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
	R111,112	2 2 2	RES 2.2kohm 5% ¼W	328222J
	R113~120	8 8 8	RES 1meg.ohm 5% ¼W	328105J
	(EQ AMP SECTION)			
	IC401	1 1 1	IC NJM2043D	518220S
	Q401~404	4 4 4	FET 2SK170 (GR or BL)	516039S
	C101	1 1 1	C-CAP 0.01uf +80, –20% 50V YG	231103Z
	C401,402	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C403,404	2 2 2	M-CAP 0.0012uf 5% 50V	222122J
	C405,406	2 2 2	M-CAP 0.01uf 5% 50V	222103J
	C407,408	2 2 2	M-CAP 0.0033uf 5% 50V	222332J
	C409,410	2 2 2	M-CAP 0.047uf 5% 50V	222473J
	C411,412	2 2 2	E-CAP 2200uf 6.3V	211042S
	C413,414	2 2 2	M-CAP 2.2uf 10% 250V	285225K
	C415,416	2 2 2	M-CAP 0.0047uf 5% 50V	222472J
	C417,418	2 2 2	E-CAP 33uf 25V	211323S
	R401,402	2 2 2	RES 100ohm 5% ¼W	328101J
	R403,404	2 2 2	RES 5.6ohm 5% ¼W	328568J
	R405,406	2 2 2	RES 47kohm 5% ¼W	328473J
	R407~410	4 4 4	RES 5.6kohm 5% ¼W	328562J
	R411,412	2 2 2	RES 27kohm 5% ¼W	328273J
	R413,414	2 2 2	RES 150ohm 5% ¼W	328151J
	R415~418	4 4 4	RES 5.6kohm 5% ¼W	328562J
	R419,420	2 2 2	RES 68kohm 5% ¼W	328683J
	R421~424	4 4 4	RES 120ohm 5% ¼W	328121J
	R425,426	2 2 2	RES 12ohm 5% ¼W	328120J
	R427,428	2 2 2	RES 560ohm 5% ¼W	328561J
	R429,430	2 2 2	RES 100kohm 5% ¼W	328104J
	(MUTING SECTION)			
	C701,702	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	R701,702	2 2 2	RES 1kohm 5% ¼W	328102J
	R703,704	2 2 2	RES 27kohm 5% ¼W	328273J
	R705,706	2 2 2	RES 3.3kohm 5% ¼W	328332J
	(FLAT AMP SECTION)			
408	VR1	1 1 1	VR 100kohm (B) x 2	4390180
409	VR2	1 1 1	VR 250kohm (MN)	4321440
	IC701	1 1 1	IC NJM2043D	518220S
	Q701~704	4 4 4	FET 2SK117 (GR)	516048S
	C703~706	4 4 4	M-CAP 0.047uf 5% 50V	222473J
	C707,708	2 2 2	C-CAP 47pf 10% 50V SL	232470K
	C709,710	2 2 2	M-CAP 0.001uf 5% 50V	222102J
	C711,712	2 2 2	M-CAP 2.2uf 10% 250V	285225K
	C713,714	2 2 2	M-CAP 0.0018uf 5% 50V	222182J
	R709,710	2 2 2	RES 8.2kohm 5% ¼W	328822J
	R711,712	2 2 2	RES 150kohm 5% ¼W	328154J
	R713,714	2 2 2	RES 1kohm 5% ¼W	328102J
	R715,716	2 2 2	RES 330kohm 5% ¼W	328334J
	R717~720	4 4 4	RES 5.6kohm 5% ¼W	328562J
	R721,722	2 2 2	RES 27kohm 5% ¼W	328273J
	R723,724	2 2 2	RES 1kohm 5% ¼W	328102J
	R725,726	2 2 2	RES 5.6kohm 5% ¼W	328562J
	R729,730	2 2 2	RES 33kohm 5% ¼W	328333J
	R731,732	2 2 2	RES 5.6kohm 5% ¼W	328562J
	R733,734	2 2 2	RES 560ohm 5% ¼W	328561J
	R735,736	2 2 2	RES 68kohm 5% ¼W	328683J
	R737~740	4 4 4	RES 56ohm 5% ¼W	328560J

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REF. No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
			(CX NR SECTION)	
	IC901	1 1 1	IC HA-12044	518224S
	Q804	1 1 1	TR 2SC1815 (Y or GR)	512107S
	Q805	1 1 1	TR 2SA1015 (Y)	510102S
	ZD803,804	2 2 2	Zener diode RD9.1EB2	502055S
	C816,817	2 2 2	E-CAP 22uf 10V	211122S
	C818,819	2 2 2	E-CAP 100uf 10V	211130S
	C901,902	2 2 2	E-CAP 10uf 16V	211220S
	C903,904	2 2 2	C-CAP 150pf 10% 50V SL	232151K
	C905,906	2 2 2	E-CAP 2.2uf 50V	211512S
	C907,908	2 2 2	M-CAP 0.068uf 5% 50V	222683J
	C909	1 1 1	E-CAP 0.47uf 50V	211505S
	C910	1 1 1	E-CAP 22uf 10V	211122S
	C911	1 1 1	M-CAP 0.1uf 5% 50V	222104J
	R809,812	2 2 2	FP-RES 220ohm 5% ¼W	328221L
	R810,811	2 2 2	RES 2.7kohm 5% ¼W	328272J
	R905,906	2 2 2	RES 470ohm 5% ¼W	328471J
	R907,908	2 2 2	RES 47kohm 5% ¼W	328473J
	R909~912	4 4 4	RES 100kohm 5% ¼W	328104J
	R913,914	2 2 2	RES 470ohm 5% ¼W	328471J
	R915~918	4 4 4	RES 47kohm 5% ¼W	328473J
	R919,920	2 2 2	RES 150kohm 5% ¼W	328154J
	R921,922	2 2 2	RES 180kohm 5% ¼W	328184J
	R923	1 1 1	RES 68kohm 5% ¼W	328683J
	R924	1 1 1	RES 6.8kohm 5% ¼W	328682J
	R925	1 1 1	RES 330ohm 5% ¼W	328331J
			(HEADPHONE AMP SECTION)	
*410		1 1 1	Jack, headphones	4550360
	IC601	1 1 1	IC LA4170	518089S
	C601,602	2 2 2	E-CAP 0.47uf 50V	211505S
	C603,604	2 2 2	E-CAP 220uf 16V	211232S
	C605,606	2 2 2	M-CAP 0.033uf 5% 50V	222333J
	C607,608	2 2 2	E-CAP 22uf 16V	211222S
	C609	1 1 1	E-CAP 100uf 16V	211230S
			(RELAY DRIVE SECTION)	
411	RELAY1	1 1 1	Relay – FBR221D012	1700490
	Q803	1 1 1	TR 2SC2240 (GR or BL)	512102S
	D803,804	2 2 2	Diode GP10-4002	560066S
	D805,806	2 2 2	Diode DS446	501028S
	ZD802	1 1 1	Zener diode RD7.5EB1	502062S
	C813	1 1 1	E-CAP 100uf 25V	211330S
	C814	1 1 1	E-CAP 220uf 10V	211132S
	C815	1 1 1	M-CAP 0.001uf 5% 50V	222102J
	R806,807	2 2 2	RES 22kohm 5% ¼W	328223J
	R808	1 1 1	FP-RES 33ohm 5% ¼W	328330L
			(MIXING AMP SECTION)	
412	VR5	1 1 1	VR 100kohm (B) x 2	4321450
	IC301	1 1 1	IC NJM2043D	518220S
	C301,302	2 2 2	E-CAP 1uf 50V	211610S
	C303,304	2 2 2	BP-CAP 1uf 50V	215510N
	C305,306	2 2 2	M-CAP 0.0047uf 5% 50V	222472J
	C307,308	2 2 2	E-CAP 33uf 25V	211323S
	C309,310	2 2 2	C-CAP 5pf ± 0.5pf 50V SL	232509D

REF. No.	SYMBOL No.	TYPE+ W E V	DESCRIPTION++	PART No.
	R301~304	4 4 4	RES 33kohm 5% ¼W	328333J
	R305~308	4 4 4	RES 82kohm 5% ¼W	328823J
	R309,310	2 2 2	RES 120kohm 5% ¼W	328124J
	R311,312	2 2 2	RES 560ohm 5% ¼W	328561J
	R313,314	2 2 2	RES 100kohm 5% ¼W	328104J
			(REGULATOR SECTION)	
	IC801	1 1 1	IC M5230L	518221S
	Q801	1 1 1	TR 2SD794 (Q or P)	513131S
	Q802	1 1 1	TR 2SB744 (Q or P)	511127S
	D801,802	2 2 2	Diode W02	560061S
	ZD801	1 1 1	Zener diode RD3.9FB2	502113S
	C801,802	2 2 2	C-CAP 0.01uf 500V	238103P
	C803,804	2 2 2	E-CAP 470uf 35V	211435S
	C805,806	2 2 2	E-CAP 4.7uf 35V	211415S
	C807	1 1 1	E-CAP 10uf 25V	211320S
	C808	1 1 1	M-CAP 0.001uf 5% 50V	222102J
	C809,810	2 2 2	E-CAP 10uf 25V	211320S
	C811	1 1 1	E-CAP 470uf 25V	211335S
	C812	1 1 1	E-CAP 10uf 16V	211220S
	R801	1 1 1	RES 33kohm 5% ¼W	328333J
	R802	1 1 1	RES 3.3kohm 5% ¼W	328332J
	R803,804	2 2 2	RES 15kohm 5% ¼W	328153J
	R805	1 1 1	FP-MO-RES 180ohm 5% 2W	362181L
			(CX CALIBRATOR SECTION)	
	VR6,7	2 2 2	VR 50kohm (A)	4310810
	LED901	1 1 1	LED PRG5114S – red and green	5060800
	R903,904	2 2 2	RES 18kohm 5% ¼W	328183J
			BETA 50/s: SELECTOR PWB ASSEMBLY	
501	S2~S9	2 2 2	Switch, tetra push – input selector	4042540
502	S10~S12	1 1 1	Switch, tri push – line out selector	4042560
503	S13~S15	1 1 1	Switch, tri push – CX-NR	4042550
504	S16~S24	3 3 3	Switch, tri push – sound processor/tone	4042570
505	LD201,202	2 2 2	LED GL-5ND5 – red and green	5060790
506	LD203~210	8 8 8	LED LN31GCPH – green	5060730
	R201	1 1 1	RES 180ohm 5% ¼W	328181J
	R202~205	4 4 4	RES 470ohm 5% ¼W	328471J

SEMICONDUCTOR DATA

TRANSISTORS

† NOTES Ge: Germanium, Si: Silicon; A: Alloy, B: Base, D: Diffused, Dd: Double-diffused; Df: Drift-field, E: Epitaxial, G: Grown, J: Junction; M: Mesa, P: Planer, Pc: Point-contact, Td: Triple-diffused

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)											MANUFACTURER
			Collector-to-Base Voltage V_{CBO} (V)	Emitter-to-Base Voltage V_{EBO} (V)	Collector Current I_C (mA)	Collector Dissipation P_C (mW)	Junction Temperature T_J (°C)	Collector Cutoff Current I_{CBO} (uA)	V_{CB} (V)	Static Forward-Current Transfer Ratio h_{FE}	V_{CE} (V)	I_C (mA)	Collector-Emitter Saturation Voltage $V_{CE(sat)}$ (V)	I_C (mA)	I_B (mA)	Gain-Bandwidth Product f_T f_{ob}* (MHz)	V_{CE} V_{CB}* (V)	I_E I_C* (mA)	Output Capacitance Cob (pF)	Others	
2SA1015 (Y)	AF, General	PNP Si-E	−50	−5	−150	400	125	−0.1 max.	−50	120 ~ 240	−6	−2	−0.3 max.	−100	−10	80 min.	−10	−1*	7 max.		TOSHIBA
2SB744 (P, Q)	AF, Power amp.	PNP Si-E	−70	−5	−3A	1W	150	−1 max.	−45	100 ~ 320	−5	−500	−2 max.	−1.5A	−150	45	−5	−100*	60		NEC
2SC1815 (Y, GR)	AF, General	NPN Si-E	60	5	150	400	125	0.1 max.	60	120 ~ 400	6	2	0.25 max.	100	10	80 min.	10	1*	3 max.		TOSHIBA
2SC2240 (GR, BL)	AF, Low noise	NPN Si-E	120	5	100	300	125	0.01 max.	120	200 ~ 700	6	2	0.3 max.	10	1	100	6	1*	3		TOSHIBA
2SD794 (P, Q)	AF, Power amp.	NPN Si-E	70	5	3A	1W	150	1 max.	45	100 ~ 320	5	500	2 max.	1.5A	150	60	5	100*	40		NEC

FIELD EFFECT TRANSISTORS

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)																MANUFACTURER
			Gate-to-Drain Voltage V_{GDO} (V)	Gate-to-Source Voltage V_{GSO} (V)	Gate Current I_G (mA)	Drain Current I_D (mA)	Total Dissipation P_D (mW)	Channel Temperature T_{ch} (°C)	Gate Leak Current: Test Conditions	Gate Leak Current: I_{GSS} (nA)	Gate to Drain Breakdown Voltage: Test Conditions	Gate to Drain Breakdown Voltage: $V_{(BR)GDO}$ (V)	Drain Current: Test Conditions	Drain Current: I_{DSS} (mA)	Gate to Source Cutoff Voltage: Test Conditions	Gate to Source Cutoff Voltage: $V_{GS(off)}$ (V)	Forward Transfer Admittance: Test Conditions	Forward Transfer Admittance: $\|Y_{fs}\|$ (mS)	Feed Back Capacitance: Test Conditions	Feed Back Capacitance: C_{rss} (pF)	Power Gain (Common Source): Test Conditions	Power Gain (Common Source): G_{PS} (dB)	Noise Figure: Test Conditions	Noise Figure: NF (dB)	
2SK117 (GR)	AF, Low noise	Si N-channel Junction	−50		10		300	125	V_{GS} = −30V, V_{DS} = 0	−1 max.	V_{DS} = 0, I_G = −100μA	−50 min.	V_{DS} = 10V, V_{GS} = 0	2.6 ~ 6.5			V_{DS} = 10V, V_{GS} = 0, f = 1kHz	15	V_{DS} = 10V, I_D = 0, f = 1MHz	3			V_{DS} = 10V, R_g = 1kΩ, I_D = 0.5mA, f = 1kHz	1	TOSHIBA
2SK170 (GR, BL)	AF, Low noise	Si N-channel Junction	−40		10		400	125	V_{GS} = −30V, V_{DS} = 0	−1 max.	V_{DS} = 0, I_G = −100μA	−40 min.	V_{DS} = 10V, V_{GS} = 0	2.6 ~ 12			V_{DS} = 10V, V_{GS} = 0, f = 1kHz	22	V_{DG} = 10V, I_D = 0, f = 1MHz	6			V_{DS} = 10V, R_g = 1kΩ, I_D = 1mA, f = 1kHz	0.5	TOSHIBA

DIODES, LEDS

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)									ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)						Others	MANUFACTURER
			Reverse Surge Voltage V_{Rsurge} (V)	Peak Reverse Voltage V_{RM} (V)	Reverse Voltage V_R (V)	Peak Forward Voltage V_{FM} (V)	Peak Forward Current I_{FM} (mA)	Average Rectified Current I_O (mA)	Forward Surge Current $I_{F\,surge}$ (A)	Junction Temperature T_J (°C)	Total Power Dissipation P_D (mW)	Forward Current I_{Fmin} (mA)	Forward Current: Test Condition V_F (V)	Forward Voltage V_{Fmax} (V)	Forward Voltage: Test Condition I_F (mA)	Reverse Current I_{Rmax} (uA)	Reverse Current: Test Condition V_R (V)		
DS446	Switching	Si-EP		105	100		500	200	0.7	175				0.65	1.5	0.1	100		SANYO
GP10-4002	Rectifier	Si-DJ		100				1A	30	175				1.1	1A	5			GENERAL INSTRUMENT
W02	Rectifier	Si-DJ (Bridge)	200	200		140		1.5A	50	150				1	1A	10			GENERAL INSTRUMENT
LN31G-CPH	Indicator (green)	GaP			4		40			85	90			2.8	20	10	4		MATSUSHITA
GL-5ND5	Indicator (red/green)	GaP/GaAsP	(red)				50			85	70			2.4	20	10	4		SHARP
			(green)								85			2.8					
PRG-5114S	Indicator (red/green)	GaP/GaP	(red)				100			85	75			2.5	10				STANLEY
			(green)								125								

ZENER DIODES

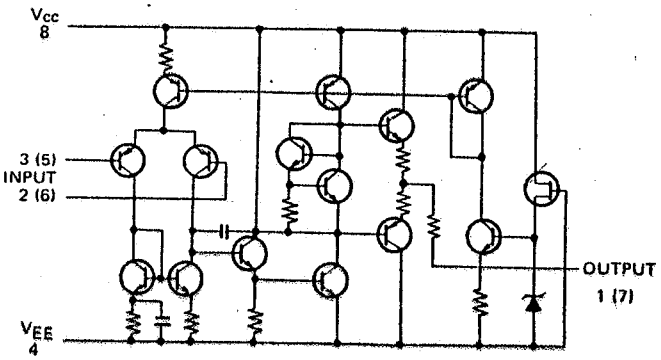
DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)			ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)													MANUFACTURER
			Total Power Dissipation P_D (mW)	Zener Current I_Z (A)	Junction Temperature T_J (°C)	Zener Voltage V_Z: MIN (V)	V_Z: TYP (V)	V_Z: MAX (V)	V_Z: Test Conditions I_Z (mA)	Differential Resistance r_Z: TYP (Ω)	r_Z: MAX (Ω)	r_Z: Test Conditions I_Z (mA)	Temperature Coefficient γ_Z: TYP (%/°C)	γ_Z: MAX (%/°C)	γ_Z: Test Conditions I_Z (mA)	Reverse Current I_Z: MAX (μA)	Reverse Current: Test Conditions V_R (V)	Others	
RD3.9-EB2	Regulator	Si-J	400		175	3.89		4.16	20		50	20				10	1		NEC
RD7.5-EB1	Regulator	Si-J	400		175	6.85		7.22	20		10	20				2	4		NEC
RD9.1-EB2	Regulator	Si-J	400		175	8.67		9.01	20		10	20				2	6		NEC
RD3.9-FB2	Regulator	Si-J	1000		175	3.88		4.15	40		15	40				40	1		NEC

INTEGRATED CIRCUIT NJM2043D

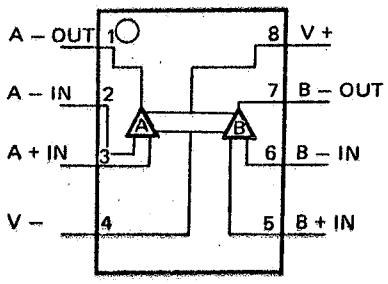
FUNCTION/MANUFACTURER

■ Dual Pre-amplifier/JRC

EQUIVALENT CIRCUIT



CONNECTION INFORMATION (TOP VIEW)

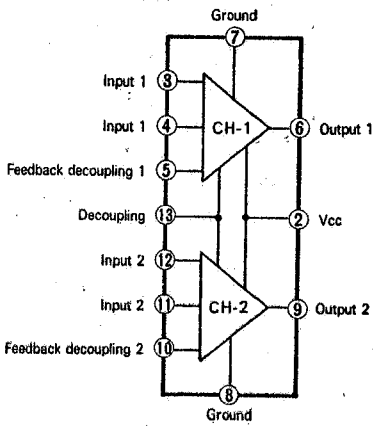


INTEGRATED CIRCUIT LA4170

FUNCTION/MANUFACTURER

■ Dual Headphone Amplifier/Sanyo

BLOCK DIAGRAM



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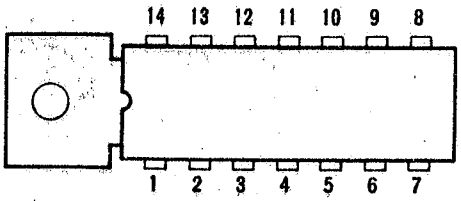
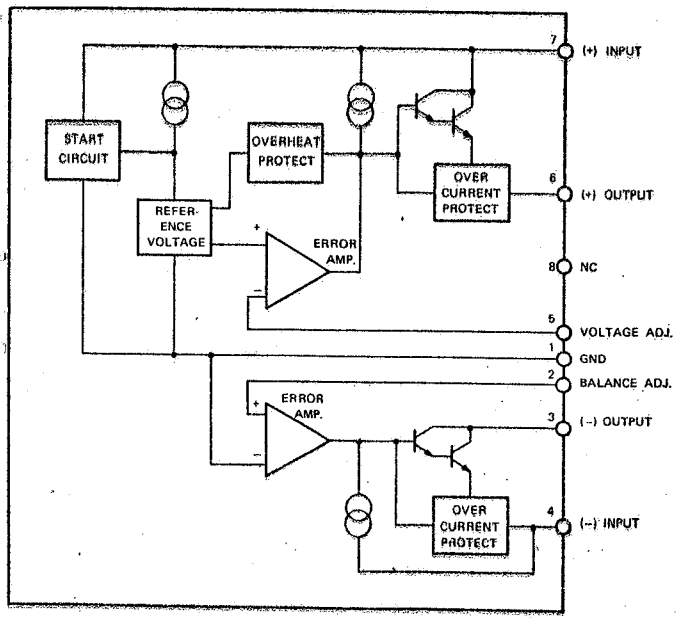


INTEGRATED CIRCUIT M5230L

FUNCTION/MANUFACTURER

■ Voltage Regulator/Mitsubishi

BLOCK DIAGRAM



CONNECTION INFORMATION (SIDE VIEW)